

## APPENDIX A

### Properties of DF2 Cold Work Tool Steel

Properties of the DF2 Cold Work Steel:

Typical analysis %	C 0.95	Mn 1.1	Cr 0.6	W 0.6	V 0.1
Standard spec.	AISI O1, WNr. 1.2510, SKS 3				
Delivery condition	Soft annealed to max. 230 HB				
Colour code	Yellow				

### **COMPRESSIVE STRENGTH**

Approximate compressive strength at room temperature.

Hardness	50 HRC	55 HRC	60 HRC	62 HRC
Compressive strength, $R_{mC}$	1700 MPa	2200 MPa	2700 MPa	3000 MPa
Compressive yield strength, $R_{c0.2}$	1350 MPa	1800 MPa	2150 MPa	2200 MPa

## PHYSICAL PROPERTIES

Hardened and tempered to 62 HRC.

Temperature	20°C	200°C	400°C
Density kg/m <sup>3</sup>	7 850	7 750	7 700
Modulus of elasticity MPa	190 000	185 000	170 000
Coefficient of thermal expansion per °C from 20°C	–	12.6 x 10 <sup>-6</sup>	13.1 x 10 <sup>-6</sup>
Thermal conductivity W/m °C	32	33	34
Specific heat J/kg °C	460	–	–

## Applications

### BLANKING, CUTTING, FORMING AND OTHER APPLICATIONS

Application	Work material thickness	Hardness HRC
<i>Tools for:</i> Blanking, punching, piercing, cropping, shearing, trimming, clipping	< 3 mm 3 - 6 mm 6 - 10 mm	60 - 62 56 - 60 54 - 56
Short cold shears		54 - 60
Clipping and trimming tools for forgings	{ Hot Cold	58 - 60 56 - 58
<i>Tools for:</i> Bending, raising, drawing, rim-rolling, spinning and flow-forming		56 - 62
Small coining dies		56 - 60
Gauges, measuring tools Turning centres Guide bushes, ejector pins, small to medium-sized drills and taps Small gear wheels, pistons, nozzles, cams		58 - 62